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A DEPARTMENT FOR THOSE WHO WANT TO GROW THINGS

EDITED BY E. D. SEYMOUR B.S.A.

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Editor's Note: One of the features of this department is the opportunity offered its readers to obtain help in solving their garden problems. Let us receive a copy of your question of each week will be answered, if possible, the following Sunday. If you desire a personal letter in reply to or instead of a printed answer in these columns, enclose a stamped, addressed envelope.

LAST week I described the building and planting of a flat or box in which to start vegetable and flower seeds indoors. The next logical step in the construction of a hotbed, which in more ways than one is simply an overgrown, outdoor flat, including in itself a source of heat to take the place of the higher temperature inside the dwelling. This heat, being a fundamental feature of the structure, may well be discussed first.

Probably nine-tenths of all the hotbeds made depend upon fermenting manure for the production of warmth. Nearly every one, I dare say, has noticed carloads of manure being hauled out from the city to nearby farm communities and observed that the masses are frequently smoking or steaming away at a great rate. And little wonder, for a thermometer thrust into the mass will register well above 100 degrees Fahr. Now, if manure that has thus begun to heat is packed in a pit and covered with a few inches of soil, it will continue to give off warmth for anywhere from three to six weeks, depending on the amount of manure and the weather conditions. And if we inclose this bed of manure and soil by lining the pit with a foundation of bricks, concrete or other masonry and setting on top of it a glass covered box we have supplied a place in which to grow even the tenderest plants while it is yet too cold outdoors to think of planting the hardier ones.

STEAM PIPES THROUGH SOIL INSTEAD OF MANURE.

If, however, you have an abundant supply of steam and can build the hotbed close to the house and care to attempt a little steam-heating, you can dispense with the manure and run three or four two-inch pipes through the soil about six inches below the surface. This is likely to have a more drying effect than the manure, so you must be prepared to see that the plants receive plenty of moisture at frequent intervals.

Some years ago one could find hotbeds heated by hot air flues run through the soil from a furnace or fire pit at one end to a chimney at the other. While practical, this is an expensive and wasteful method and is practically unknown at the present time.

Occasionally a person asks such a question as this: "I cannot obtain any manure and am unable to rig up any such scheme as you suggest, but I want a hotbed just the same. Will you please tell me how I can build and run one?" The answer, I must confess, is beyond me. There is a limit to all improvisations, and it would be equally easy to tell a person how to build a barn where he could obtain neither lumber, brick, stone, nails nor tools.

READY MADE HOTBED FRAMES ARE THE BEST.

For every one who can afford to avoid extra trouble and work by paying a little more for results, I suggest the purchase of ready made hotbed frames from the seedsmen or direct from the manufacturers of all sorts of glass structures. These can be bought complete down to the very corner bolts, and being easily set up, may be taken apart again in the fall and stored in the shed or barn over winter. The simplest way to use them is to dig the pit about two feet deep and two feet longer and wider than the frame, then fill it with the manure and set the frame right down on top. Then bank the manure up around all four sides, spread about four inches of soil inside, put on the sash, and you are ready for business. This will call for a little more manure than any other method, but it is certainly easy and has the advantage of permitting you to move the hotbed from place to place in different seasons, according to the layout of the garden.

Having mentioned the soil, I might as well digress along that line for a moment. The ideal preparation is a mixture of equal parts of good loam, rotted sod or leaf mould and manure, with a little sand added if necessary to entirely prevent any chance of packing or baking. For best results a year's preparation is desirable, but as I have suggested before, don't get discouraged if every last detail is not exactly according to Hoyle, but make up what you lack in care and the things you can supply.

No one description will fit the home-made hotbed, for it is the result of whatever materials you have on hand, how much you want to spend on it, how long it will be used and just what and how much you expect to grow in it. If you occupy a rented home, from which you may move at the end of any season, it will be foolish to build a heavy stone foundation; while if you are permanently located you will save time and money in the end by putting in a good brick or concrete base right now. Similarly if you have some old one-inch boards on hand they will do quite well enough, but if you have to buy some lumber anyway two-inch stuff gives better results and is more economical.

SIZE AND MEASUREMENTS ARE IMPORTANT.

In the first place, as to size and measurements: The unit size of a hotbed is three by six feet; that is, all ready made sash cases in those dimensions, as well as ready made frames. Thus you can easily figure how much space will be needed and how much material you are going to use. Last year I had a brilliant thought that led me to disregard these usual measurements, but I am beginning to doubt its wisdom, and merely give the details as a sort of lesson.

The previous winter I had felt the need of storm windows on the north side of the house, but I didn't feel like buying them and leaving them here in case I had to settle elsewhere. So when it came hotbed time I conceived the idea of having the hotbeds made to fit the three north windows and building the hotbed to fit them. Now, the disadvantages I discovered were these: I had to reconstruct the plans of the hotbed instead of using the figures given in various textbooks and bulletins; I had to pay considerably more for the sash, because they were of an odd size; and finally, when I got them, I realized that, for the sake of strength, sashes are made with four or five rows of narrow panes of glass and rather heavy framework, which renders them decidedly unattractive as long as

windows. Hence, my next beds will be of the ordinary, prosaic dimensions.

The other figures usually run about as follows:

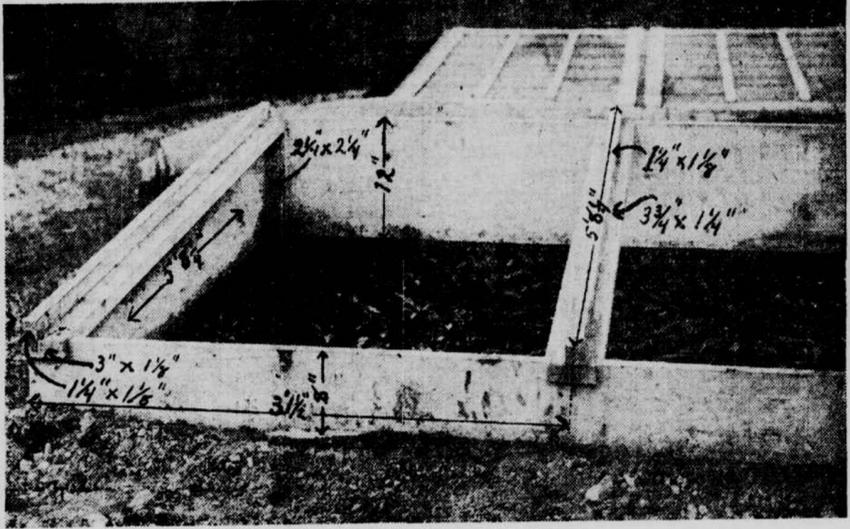
Depth of pit (manure), 2 to 3 feet.
Depth of soil, 4 to 8 inches.
Height of frame above manure (back), 18 inches.
Height of frame above manure (front), 12 inches.

With regard to the placing of the hotbed there are two essential requirements: First, the higher side, or back, must always be placed toward the north, so that the growing plants within will get the maximum amount of sunlight; second, it should be sheltered on the north by some sort of a windbreak—either a building, a board fence or even a thick hedge. In this way a considerable amount of heat is saved and the length of service of the bed increased. It is also well to see that, if the bed is placed in the lee of a building, the gutters on the latter are in good condition, for the drip from a roof is not

tender and delicious stalks a good three weeks before your less energetic neighbor begins to harvest his unprotected crop.

WHEN THE TIME ARRIVES FOR SOWING THE SEED.

And now for the details of starting this helpful apparatus, the hotbed, into action. When the manure is well packed down and the soil evenly spread and raked smooth put on the sash and leave it for a day or two. Then take the temperature of the soil (not the air) and if it is above 85 degrees cover the bed up again and leave it for a while longer. When the temperature reaches the point mentioned you can begin to sow seed. For convenience and an orderly appearance run the rows across the bed and not less than three inches apart. You can leave crops here longer than in a flat, so they will need room for the increased development.



only injurious to the plants later in the season, when the bed is uncovered, but also it soon knocks the putty out of the sash and results in more waste of heat.

A COVER MUST BE PROVIDED AGAINST EARLY FROSTS.

For the first part of the season, when real frosts can be looked for at frequent intervals, it is necessary to provide some sort of cover for the beds, especially if you are starting eggplant, pepper and tomatoes. The most common mats for this purpose are made of burlap, quilted and lined, or of straw, and both kinds may be bought at the larger seed and agricultural supply stores. On the small place it is usually better to buy them than to attempt to make them, unless one has a lot of old feed bags or other coarse material that can be roughly stitched into a blanket. And, of course, several thicknesses of newspaper or building paper, or even loose straw heaped on the sash, will do for temporary protection.

Every one will want to know, I suppose, what a hotbed may be expected to cost, and while there is possible a very wide range, an approximate figure may be found from the following data:

MADE TO ORDER OUTFIT.

One 2-sash frame complete with sash, etc. \$13.50
Four cubic yards manure (approx. 1000 lbs. net) at \$2.50..... 10.00
One mat, 6 by 6 feet, burlap..... 1.00
Total..... \$24.50
Add a minimum of labor and bother.

Since it is almost impossible to estimate any general cost for a homemade affair, I will simply suggest the materials needed for, say, a three-sash bed, such as is illustrated herewith, supplying average prices whenever possible:

LUMBER.

Frame—One piece, 9 feet 3 inches by 2 feet, one piece, 9 feet 3 inches by 18 inches, two pieces, 9 feet by 2 feet, two pieces, 2 feet by 2 inches by 4 inches, 2 posts, 4 feet by 2 inches by 4 inches.
Sash bars—Two pieces, 4 feet 3 inches by 2 inches by 1 inch.
End bars—Two pieces, 6 feet 3 inches by 1 inch by 4 inches.
Three sash (unpainted) \$1.10 each, glazed \$2.50 each.
Five cubic yards, more or less, of manure (approximately \$12).
One-half to one cubic yard of soil (depending on the depth).
Twenty and one-half cubic feet of concrete (for foundation 4 inches thick) if desired.

Within the last few years there have been put on the market smaller frames of various dimensions designed to protect

VEGETABLES AT CLOSE RANGE.

Newcomers in the gardening field will perhaps be glad of a personal introduction, as it were, to the various sorts of vegetables and a list of really reliable varieties. We will, therefore, run through the list, taking them alphabetically, for the next week or two.

ARTICHOKE.

Neither the Globe nor the Jerusalem type is common in home gardens. The former is, however, rather ornamental, with its jagged, spiny leaves and large, edible flower heads. Rich soil and a sunny location are necessary. With slight winter protection the plants will bear for two or three years. The Jerusalem type, cultivated for its potato-like tubers, will grow under any average conditions and if given care will spread rapidly.

ASPARAGUS.

Asparagus cannot endure excessive moisture, but withstands severe drought and the proximity of salt water, which is injurious to most vegetables. A well enriched sandy loam is excellent. Mammoth, Colossal and Palmetto are the leading varieties.

BEANS.

All beans need a light, warm soil and weather ranging from warm to decidedly hot. There are several types, of which reliable varieties are:

BUSH BEANS.
Green podded—Valentine, Bountiful, Yellow Six Weeks, Refugee.
Wax podded—Brittle Wax, Stringless, White Wax, Lustproof, Golden Wax.
Bush Lima—Fordhook, Kumero.

Pole Beans.

Running beans—Kentucky Wonder, Dutch Cass, Kettle, Horticultural, Pole Lima—Giant Podded, Early Leviathan, Challenger.

BEETS GROW WELL IN PRACTICALLY ANY SOIL.

BEETS make a delightfully cosmopolitan crop, growing well in practically any soil that does not tend to pack and form a crust about them. The secret is to grow them rapidly, without a check, and to use them as soon as they are of edible size. The first crop or two

may be forced in a hotbed, the first outdoor planting being made as soon as the ground can be worked. The standard varieties are Crosby's Egyptian, Edmand's Early, Detroit Dark Red, and Eclipse.

BRUSSELS SPROUTS.

BRUSSELS SPROUTS are closely allied to cabbage and require the same treatment, which is given in some detail below. Long Island Improved and Danish Prize are both good.

CABBAGE is a very satisfactory crop where there is plenty of room to spare, for a freshly harvested, young, tender head is infinitely more delicate and delicious than the hoary winter supply, by which many of us must judge the vegetable. Its requirements are a loose, rich soil, plenty of moisture and rapid, unchecked growth. Start the seed in a plot or a hotbed within the next few days, and when the seedlings are about two inches high thin them out to stand four inches

CHIVES.

CHIVES are odd little members of the onion family, growing vigorously anywhere, from clumps or roots. There are no varieties and not many uses for the plant. But the slender, delicately flavored leaves cut in small pieces and mixed with cream cheese make a delicious sandwich filling.

QUESTIONS ABOUT REAL GARDENS AND ANSWERS.

I want to grow tomatoes and other vegetables in my yard this summer. Our soil is mostly clay, that becomes hard and cloddy in dry weather, and I would like to know how to loosen it up and make it better for garden crops.

A. C. N.

The loosening and improvement of a heavy clay soil is a slow, tedious task, and you must not look for great changes too quickly. The best steps you can take this spring are as follows: (1) Plough or dig under a heavy dressing of well rotted manure. Do not attempt this until the soil is obviously workable or you will be in worse trouble than ever. If a heavy soil is ploughed or spaded when too wet it bakes into large, almost indestructible clods that cannot be broken down entirely in less than three or four years. (2) Spread on the newly broken surface sifted coal ashes, about five pounds a hundred square feet, and work this in well with a harrow or spading fork. (3) Again spread over the rough surface of the garden about the same amount of freshly slaked lime, or twice as much finely ground, raw limestone, if this is more available, and work this in with a rake before sowing any seeds. At the end of the season—say about the first week in September, scratch the soil with a rake between all the rows of crops and sow rye or vetch. This will grow up before cold weather and remain as a "cover crop" until ploughing time next spring. Or, if the fall is mild and the cover crop makes a growth of eight inches or so before frost, dig the garden or plough it up, then and leave it in rough furrows over winter. The frost will help to break it down and make it looser for the following season.

The soil in your garden was originally very poor and sandy, but by adding lots of kitchen scraps, waste parts from vegetables, and by digging under a cover crop of rye or clover each spring we have in three or four years brought it into apparently very much better condition. But it still seems to lack something—a vigor or fertility whose absence is indicated in the slow and stunted growth of our crops. Can you suggest what the soil needs and how we can supply it?

J. S. K.

Without doubt what your crops miss is soluble, quickly available plant food. In the cover crops and other improvised manures you have supplied one very valuable material—namely, humus, or decaying vegetable matter—but this is simply the raw material from which the real plant foods can be obtained only after several years of decomposition and chemical change. It is as though you gave a child raw wheat and a cow with the expectation that it could obtain therefrom bread and milk without further preparation.

What you should add, therefore, is chemical fertilizer, such as nitrate of soda or ammonium sulphate, and the nitrogen, sulphate or muriate of potash to supply potassium and raw or dissolved phosphoric acid. These three being the most essential elements in plant growth. All these matters I hope to take up in detail later on in the season, when there is more time to go into principles and explanations. About as good a thing as you can do without studying the question carefully is to buy at the seed store a bag or so of some reliable prepared fertilizer and apply it to the garden before planting time according to the directions that will accompany it or that can be obtained in the "literature" put out by its manufacturer.

Is it wise to mix coal ashes with the soil in a garden with a view to improving it? A neighboring florist suggested last year that I add ashes to the soil when I planted my tomatoes, and the plants certainly flourished, so I thought of applying some all over the yard. How such ashes as any real fertilizing value?

J. H. Q.

As suggested in the reply to A. C. N. above, coal ashes are of considerable use

in lightening a heavy clay soil, but I certainly should not so use them with their effect on the physical condition of the soil. Coal ashes have absolutely no fertilizing value.

SPRAY WITH IN-SECT-INE

UNITED STATES DEPARTMENT OF AGRICULTURE BUREAU OF ENTOMOLOGY, WASHINGTON, D. C.

WHAT TO SPRAY AND WHAT TO SPRAY FOR.	WHAT TO SPRAY WITH.	TIME OF FIRST SPRAYING.
APPLES—Bitter Rot, Canker Worm, San Jose Scale, Scab	Spray with In-sect-ine	First appearance of rot. On first appearance of worms. Spray in fall. As the buds are swelling.
ASPARAGUS—Beetle, Rust	Spray with In-sect-ine	Early spring. After cutting crop.
BLACKBERRY—Anthracnose	Spray with In-sect-ine	On first appearance of worms.
CABBAGE AND CAULIFLOWER	Spray with In-sect-ine	On first appearance of worms.
CELERY	Spray with In-sect-ine	On young seedlings.
CHERRY—Aphis, San Jose Scale, Leaf-spot	Spray with In-sect-ine	At first appearance. Before buds open. When plants begin to run.
CUCUMBER—Downy Mildew	Spray with In-sect-ine	When plants begin to run.
CURRIANT—Leaf-spot, Worm	Spray with In-sect-ine	As leaves are unfolding. When they first appear.
GOCSEBERRY—Leaf-spot, Mildew	Spray with In-sect-ine	Before leaves start to break. When buds are breaking.
GRAPE—Anthracnose, Berry Moth, Downy or Powdery Mildew, Rot	Spray with In-sect-ine	Just before buds open. Before blossoms are ready to open. Just before blossoming. Just before blossoming.
MUSEMELON—Anthracnose, Downy Mildew, Leaf-blight	Spray with In-sect-ine	When plants begin to run. July 25 to Aug. 1. When plants begin to vine.
PEACH—Leaf-curl, Brown Rot	Spray with In-sect-ine	On both, to make doubly sure. About time shoots are showing from young fruit or on first appearance.
Scab	Spray with In-sect-ine	Just as buds begin to swell.
San Jose Scale	Spray with In-sect-ine	In late fall or early spring, or both, if bad.
PEAR—Leaf-blight, Psylla	Spray with In-sect-ine	Cut out the branches on first appearance on twigs. In winter use commercial lime-sulphur for eggs.
PELUM—Curetil, Aphis, Shot-hole Fungus, Rot	Spray with In-sect-ine	With starting of buds. On appearance of aphids. When leaves are half grown. As buds are swelling or on appearance.
POTATO—Early Blight, Late Blight, Potato Beetle	Spray with In-sect-ine	When plants are 4 inches high. As for early blight, July. When pest appears. Before leaves open.
RASPBERRY—Anthracnose, Saw-fly, Leaf-spot	Spray with In-sect-ine	When first pest appears. When leaves are half grown.
ROSE—Leaf-spot, Slug	Spray with In-sect-ine	On first appearance of fungus. On appearance of slugs.
STRAWBERRY—Leaf-spot	Spray with In-sect-ine	Soon after growth begins.
SQUASH—Aphids, Lady Beetle	Spray with In-sect-ine	Under side of leaf. As soon as pest appears.
TOMATO—Anthracnose, Leaf-blight, White Fly	Spray with In-sect-ine	Soon after fruit begins to set. Three weeks after transplanting. Spray underside of leaves thoroughly.
For Codling Moth	Spray with In-sect-ine	Spray thoroughly soon as leaves are out.
For Tussock Moth	Spray with In-sect-ine	Spray thoroughly soon as leaves are out.

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